Materials Engineering Branch

TIP*

No. 012 Lacing Cord Contamination Potential

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Lacing cords, tapes and cable ties used on spacecraft for electrical cables can be a major source of contamination in vacuum applications including thermal vacuum testing. Many of these tie materials are coated with wax, silicone rubber or other material to improve their tying characteristics. These coatings are normally quite volatile. In addition to not using these on spacecraft hardware itself, such contaminant sources also should not be used on the test equipment that goes into the vacuum chamber during thermal vacuum testing of flight hardware.

The Materials Engineering Branch outgassing compilation (RP 1124) or the Materials Selection Guide, also published by the Materials Engineering Branch, can be consulted to select those materials which have exhibited acceptably low outgassing characteristics in the vacuum screening test at 125°C, that is, < 1.0% total mass loss and < 0.1% collected volatile condensable material. A vacuum baking treatment prior to use can make some of the tie materials acceptable from an outgassing standpoint. Of the few tie materials that do not require pre-baking in vacuum, the TEMP-LACE H Series, Gude-Glass series and Super-Gude-Space DPT-H Scoured Dacron are recommended. However, as with certain other materials, the outgassing properties may be lot dependent and should be tested prior to use.

Although all of the above suggested lacing cords are acceptable from an outgassing standpoint, the Super-Gude-Space DPT-H Scoured Dacron has been determined to be the easiest to tie, has the best knot retention and displays the least amount of fraying at the ends. It is also recommended that all lace ends be staked with a suitable urethane adhesive.

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